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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/700,006	VERSER ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-17,20-22,24,25,27-36,39-41 and 43-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-17,20-22,24,25,27-36,39-41 and 43-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Appeal Brief

1. Applicant's appeal brief, submitted on January 25, 2007, has been received and carefully considered. Applicant's arguments as presented in the appeal brief are persuasive and, therefore, the finality of the previous Office Action is withdrawn.

2. Claims 4, 18, 19, 23, 26, 37, 38 and 42 are cancelled. Claims 1-3, 5-17, 20-22, 24, 25, 27-36, 39-41 and 43-51 are under consideration.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 36, 43, 46 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Rosenbaum et al. (US 3,816,379).

Regarding claim 36, Rosenbaum et al. (see Figure; generally described at column 6, line 5 to column 10, line 25) discloses an apparatus comprising:

(a) a polymerization reactor **25** in which one or more olefins are polymerized to form solid polymer particles in a hydrocarbon fluid (see column 1, line 5 to column 2, line 30);

(b) an intermediate pressure chamber **28, 32** having an inlet for receiving hydrocarbon fluid and polymer from the polymerization reactor **25**, a polymer outlet (e.g., to line **29, 33**), and a gas outlet (e.g., to line **69, 70**); (see column 2, line 60 to column 3, line 51);

(c) a condenser **72** fluidically connected to the gas outlet of the intermediate pressure

chamber (i.e., via line **71**);

(d) a purge column (i.e., vessel **38**) fluidically connected to the polymer outlet of the intermediate pressure chamber (i.e., via line **33**);

(e) a hydrocarbon/purge gas recovery unit (i.e., cooler **41**/vessel **42**) adapted to separate hydrocarbon fluid from the purge gas, the recovery unit fluidically connected to a top portion of the purge column **38** (i.e., via line **40**);

(f) a recycle tank (i.e., vessel **73**) adapted to receive condensed hydrocarbon vapor from the condenser **72**;

(g) a liquid delivery conduit (i.e., line **74**) fluidically connecting a bottom portion of the recycle tank **73** with the reactor **25**, wherein the fluidic connection between the recycle tank **73** and the reactor **25** does not include a fractionation column; and

(h) a vapor delivery conduit (i.e., line **75**) coupled to a top portion of the recycle tank **73** and fluidically connected to a first fractionation column **78**.

Regarding claim 43, Rosenbaum et al. does not disclose a purge gas flare in connection with the recovery unit **41/42**. Rosenbaum et al. merely states that a gas in line **48** is vented (see column 10, lines 1-8). No flame is disclosed.

Regarding claim 46, Rosenbaum et al. (see Figure; generally described at column 6, line 5 to column 10, line 25) discloses a method of processing effluent **26** of a polymerization reactor **25**, the effluent comprising hydrocarbon liquid and polymer solids (see column 1, line 5 to column 2, line 29), the method comprising:

separating a majority of the hydrocarbon liquid from the polymer solids in the effluent by flashing the majority of the hydrocarbon liquid to generate a hydrocarbon vapor (i.e., by pressure

let down via throttle valves **27,31** and separation of phases in vessels **28,32**; see column 2, line 60 to column 3, line 50);

transporting and condensing the hydrocarbon vapor to form a recovered hydrocarbon liquid (i.e., vapor from the vessels **28,32** is transported to a condenser **72** via lines **69,70,71** for partial condensation);

transporting an equilibrium vapor of the recovered hydrocarbon liquid to a fractionation system (i.e., the vapor phase in vessel **73** is sent to a fractionator **78** via line **75**; see column 5, lines 20-36); and

recycling at least a portion of the recovered hydrocarbon liquid to the polymerization reactor **25** without fractionating the recovered hydrocarbon liquid (i.e., the liquid phase in vessel **73** is sent directly to the reactor **25** via line **74**; see also column 4, lines 43-58).

Regarding claim 49, Rosenbaum et al. further discloses the step of purging the polymer solids with a purge gas (e.g., steam) to remove residual hydrocarbon entrained in the polymer solids, to form a first stream (i.e., in line **40**, from vessel **38**) comprising purge gas and the residual hydrocarbon (see column 8, lines 37-58; Figure).

Instant claims 36, 43, 46 and 49 read on the apparatus and process of Rosenbaum et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the

claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 5-7, 9-14, 25, 27 and 29-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Sherk et al. (US 4,501,885).

Regarding claims 1, 5-7, 14, 25, 27 and 34 Rosenbaum et al. (see Figure; generally described at column 6, line 5 to column 10, line 25) discloses a process for slurry polymerization and for separating hydrocarbon fluid from solid polymer particles and purge gas, said process comprising:

polymerizing in a reaction zone **25** at least one olefin monomer to produce a slurry, comprising solid polymer particles and hydrocarbon fluid (see column 1, line 5 to column 2, line 30);

withdrawing a portion of the slurry from the reaction zone **25** (i.e., via line **26**);

separating at least a majority of the hydrocarbon fluid from the solid polymer particles in an intermediate pressure zone as a vaporized hydrocarbon fluid stream (i.e., by pressure let down via throttle valves **27**,**31** and separation of phases in vessels **28**,**32**, with the vaporized hydrocarbon exiting via line **69**,**70**; see column 2, line 60 to column 3, line 50);

condensing the vaporized hydrocarbon fluid stream in a condensing zone **72**, whereby a condensed hydrocarbon fluid stream is formed;

transferring the condensed hydrocarbon fluid stream from the condensing zone **72** to a recycle zone (i.e., vessel **73**);

transferring the solid polymer particles from the intermediate pressure zone to a purge zone (i.e., vessel **38**) in which a purge gas (i.e., steam, supplied via line **37**) is passed through the solid polymer particles to remove entrained hydrocarbon fluid, thereby forming a mixed stream containing hydrocarbon vapor and purge gas (i.e., in line **40**);

transferring the mixed stream to a recovery zone (i.e., cooler **41**/vessel **42**) where the purge gas and the hydrocarbon fluid are separated to form a water phase of condensed steam (i.e., exiting via **43**) and a recovered hydrocarbon fluid stream (i.e., exiting via **44**);

passing at least a portion of the recovered hydrocarbon fluid stream **44** from the recovery zone **41/42** to a fractionation zone **46**;

passing at least a portion of the recovered hydrocarbon fluid stream from the recovery zone **41/42** to the recycle zone **73** (i.e., indirectly, via line **44**, to line **63**, to line **69**, **70**, **71**);

transferring vapor, or substantially no liquid, from the recycle zone **73** to a fractionation zone **78** (i.e., via line **75**); and

transferring hydrocarbon liquid from the recycle zone **73** to the reaction zone **25** (i.e., via line **74**) without fractionating the hydrocarbon liquid.

In Rosenbaum et al., the step of purging the polymer solids (i.e., in vessel **38**) uses a purge gas comprising steam (i.e., supplied via line **37**) to remove the residual hydrocarbon entrained in the polymer solids. The steam is separated from the hydrocarbon by condensing the steam in a cooler **41** and removing, via line **43**, the condensed steam as a water phase from the vessel **42**. Rosenbaum et al. is silent as to the use of a different purge gas for removing the residual hydrocarbon entrained in the polymer solids, e.g., a non-condensable purge gas, such that the separation of the purge gas from the residual hydrocarbon involves the separation of a

gas phase (and not a liquid, water phase) from the residual hydrocarbon in the recovery zone.

Sherk et al. teaches a process for removing diluent from a polymer solid comprising the steps of purging a polymer solid (i.e., in a purge column **20**) with a purge gas (e.g., nitrogen; column 2, lines 29-31) to remove residual hydrocarbon entrained in the polymer solids, to form a first stream comprising the purge gas and the residual hydrocarbon (i.e., exiting the top of the purge column **20**, see figure); and separating the purge gas from the first stream in a recovery zone (i.e., comprising vessels **42**, heat exchanger **44**, compressors **28**,**32**, etc.), to form a second stream comprising separated purge gas (i.e., in recycle line **50**), and a third stream comprising primarily hydrocarbon (e.g., an isobutene stream, see figure).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a different purge gas, e.g., a non-condensable purge gas, and a corresponding recovery zone for the purge gas steam in the process of Rosenbaum et al., absent a showing of unexpected results thereof, because the substitution of one known equivalent technique (of removing diluent from a polymer solid) for another was held to be obvious, even if the prior art does not expressly suggest the substitution. *Ex parte Novak* 16 USPQ 2d 2041 (BPAI 1989); *In re Mostovych* 144 USPQ 38 (CCPA 1964); *In re Leshin* 125 USPQ 416 (CCPA 1960); *Graver Tank and Manufacturing Co. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

In addition, Sherk et al. (see Figure; column 2, line 68 to column 3, line 5) teaches the step of passing at least a portion of the recovered purge gas stream **50** from the recovery zone to the purge zone **20**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to further provide the step of passing at least a portion of the recovered

purge gas stream from the recovery zone to the purge zone in the modified process of Rosenbaum et al., because such step would allow for the additional recovery of any diluent remaining in the purge gas stream. As indicated in Sherk et al., such recovery would be desirable in order to minimize loss of diluent, and thereby minimize operating costs and hydrocarbon emissions (see column 1, lines 47-59).

Regarding claim 2, as best understood, Sherk et al. teaches the step of passing a second portion of the recovered purge gas stream **50** from the recovery zone to a closed loop transfer zone (see closed flow loop in the figure).

Regarding claims 9 and 29, Sherk et al. further teaches that the recovered purge gas stream from the recovery zone is not flared, but recovered (see column 3, lines 58-52).

Regarding claims 10-13 and 30-33, Sherk et al. further teaches that the recovered purge gas stream contains a very low concentration of hydrocarbon (see column 3, lines 54-60; column 3, line 67 to column 4). Although the claimed concentrations of hydrocarbon in the recovered purge gas stream (in ppm) are not explicitly taught in Sherk et al., it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate concentration of hydrocarbon (in ppm) for the recovered purge gas stream in the modified process of Rosenbaum et al. because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233.*

Regarding claim 35, Sherk et al. further teaches that the recovered purge gas stream **50** is at least partially used for providing a motive force to the solid polymer particles which have already passed through the purge zone **20** (see intersection of line **50** with the stream exiting the

purge column **20**; figure).

5. Claims 3 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Sherk et al. (US 4,501,885), as applied to claim 1 above, and further in view of Sung (US 5,314,579).

Rosenbaum et al. is silent as to the step of feeding purge gas to an extrusion feed zone. Sung (see figure; column 5, line 39 to column 6, line 21) teaches an extrusion feed zone (i.e., tank **60**, for feeding an extruder, not shown, via line **82**), where a purge gas (i.e., steam, N_2) is fed the extruder feed zone. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide the step of feeding purge gas to an extrusion feed zone in the modified process of Rosenbaum et al., because such would allow for any remaining hydrocarbon to be removed from the polymer particles before sending the polymer particles to an extruder for final processing, as taught by Sung. In addition, it would have been obvious for one of ordinary skill in the art at the time the invention was made to feed either a recovered purge gas and/or a fresh purge gas to the extrusion feed zone or purge zone in the modified process of Rosenbaum et al., for the known and expected result of obtaining a mixed feed stream of the desired hydrocarbon concentration, and a recovered purge gas or hydrocarbon stream of the desired concentrations.

6. Claims 8 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Sherk et al. (US 4,501,885), as applied to claims 1, 6, 7, 25 and 27 above, and further in view of Findlay (US 3,035,040).

Rosenbaum et al. further discloses processing the equilibrium vapor in the fractionation system **78** to generate a liquid hydrocarbon that is recycled to the reactor **25** (i.e., via line **84**).

Rosenbaum et al., however, is silent as to using the liquid hydrocarbon in catalyst preparation and delivery. Findlay, however, teaches the use of recycled diluent in catalyst preparation and delivery (i.e., recycle solvent in line **39**, in combination with catalyst mud feeder **16**; Figure). It would have been obvious for one of ordinary skill in the art at the time the invention was made to use the liquid hydrocarbon from the fractionation system in catalyst preparation and delivery in the modified process of Rosenbaum et al., because it is preferable to suspend the catalyst in a diluent if the catalyst is in a particular form, as taught by Findlay (see column 2, lines 53-58). With respect to the transfer of a minor or a major portion of the liquid hydrocarbon to the catalyst mud preparation zone or the recycle zone, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate amount of liquid hydrocarbon to transfer to each of the catalyst mud preparation and the recycle zones in the modified process of Rosenbaum et al. because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller, 105 USPQ 233*.

7. Claims 15-17, 20, 22, 24 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Hanson (US 5,597,892) and Sung (US 5,314,579).

Regarding claims 15 and 16, Rosenbaum et al. (see Figure; generally described at column 6, line 5 to column 10, line 25) discloses an apparatus comprising:

(a) a polymerization reactor **25** in which one or more olefins are polymerized to form solid polymer particles in a hydrocarbon fluid (see column 1, line 5 to column 2, line 30);

(b) an intermediate pressure chamber **28,32** having an inlet for receiving hydrocarbon fluid

and polymer from the polymerization reactor **25**, a polymer outlet (e.g., to line **29**,**33**), and a gas outlet (e.g., to line **69**,**70**); (see also column 2, line 60 to column 3, line 51);

(c) a condenser **72** fluidically connected to the gas outlet of the intermediate pressure chamber (i.e., via line **71**);

(d) a purge column (i.e., vessel **38**) fluidically connected to the polymer outlet of the intermediate pressure chamber (i.e., via line **33**);

(e) a hydrocarbon/purge gas recovery unit (i.e., cooler **41**/vessel **42**) adapted to separate hydrocarbon fluid from the purge gas, the recovery unit fluidically connected to a top portion of the purge column **38**;

(f) a recycle tank (i.e., vessel **73**) adapted to receive condensed hydrocarbon vapor from the condenser **72**;

(g) at least one conduit (i.e., line **74**) fluidically connected to a bottom portion of the recycle tank **73**, adapted to transport the condensed hydrocarbon fluid from the recycle tank **73** to the reactor **25** without transporting the condensed hydrocarbon fluid through a fractionation system; and

(h) a vapor delivery conduit (i.e., line **75**) coupled to a top portion of the recycle tank **73** and fluidically connected to a first fractionation column **78**.

Rosenbaum et al. is silent as to the provision of a pump under item (g). Hanson, however, evidences the conventionality of providing a pump **44** for enabling the pumping of recovered hydrocarbon liquid from a recycle tank **42** back to a polymerization reactor **10**, via conduit **16** (see FIG. 1; column 3, lines 8-9). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a pump for pumping the recovered

hydrocarbon liquid from the recycle tank **73** to the reactor **25** in the apparatus of Rosenbaum et al., on the basis of suitability for the intended use thereof, because the provision of a pump for pumping the recovered hydrocarbon liquid from the recycle tank to the polymerization reactor would have been considered conventional in the art, as evidenced by Hanson, and furthermore, the pump would have enabled the feeding of recovered hydrocarbon liquid to the reactor to occur at a desired pressure and flow rate.

Rosenbaum et al. is also silent as to the provision of an extruder feed tank under item (i), where a fresh purge gas feed is connected to the extruder feed tank. Sung (see figure; column 5, line 39 to column 6, line 21) teaches an extruder feed tank (i.e., tank **60**, for feeding an extruder, not shown, via line **82**), where a fresh purge gas feed (i.e., steam, N_2) is connected to the extruder feed tank. It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide an extruder feed tank, with a fresh purge gas feed, in the modified apparatus of Rosenbaum et al., on the basis of suitability for the intended use thereof, because such would allow for any remaining hydrocarbon to be removed from the polymer particles before sending the polymer particles to an extruder for final processing, as taught by Sung.

Regarding claim 17, Rosenbaum et al. discloses that the recycle tank **73** is fluidly connected to receive a second hydrocarbon fluid stream from the hydrocarbon/purge gas recovery unit **41/42** (i.e., indirectly, via line **44**, to line **63**, to lines **69**, **70**, **71**; see Figure).

Regarding claim 20, Rosenbaum et al. discloses that the first fractionation column **78** does not have a side draw (see figure).

Regarding claim 22, although Rosenbaum et al. is silent as to the provision of a second fractionation column adapted to receive a top product from the first fractionation column **78**, it

would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a second fractionation column in the modified apparatus of Rosenbaum et al., on the basis of suitability for the intended use thereof, because the duplication of parts was held to have been obvious, *St. Regis Paper Co. v. Beemis Co. Inc.* 193 USPQ 8, 11 (1977); *In re Harza* 124 USPQ 378 (CCPA 1960), and the provision of a second fractionation column for enabling further separation of the fluid components would have been considered conventional in the art, as evidenced by the provision of the first and second fractionation columns **46** and **53** in the apparatus of Rosenbaum et al.

Regarding claim 24, Rosenbaum et al. does not disclose a purge gas flare being connected to the recovery unit **41/42**. Rosenbaum et al. merely states that a gas in line **48** is vented (see column 10, lines 1-8). No flame is disclosed.

Regarding claim 45, although Sung et al. is silent as to the purge gas (i.e., steam, N_2) for the extruder feed tank **60** comprising a recovered purge gas from a recovery zone, it would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the extruder feed tank to receive a recovered purge gas stream from the recovery zone in the modified apparatus of Rosenbaum et al., on the basis of suitability for the intended use thereof, because the recycling of process fluids to minimize cost and emissions would have been considered conventional in the art.

8. Claims 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Hanson (US 5,597,892) and Sung (US 5,314,579), as applied to claims 15, 20 and 22 above, and further in view of Findlay (US 3,035,040).

Rosenbaum et al. further discloses processing the equilibrium vapor in the fractionation

system **78** to generate a liquid hydrocarbon that is recycled to the reactor **25** (i.e., via liquid delivery conduit **84**). Rosenbaum et al., however, is silent as to feeding the liquid hydrocarbon to a catalyst preparation tank. Findlay, however, teaches the feeding of a liquid hydrocarbon (in line **39**) to a catalyst preparation tank **16**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to supply the liquid hydrocarbon from the liquid delivery conduit to a catalyst preparation tank in the modified apparatus of Rosenbaum et al., because it is preferable to suspend the catalyst in a diluent if the catalyst is in a particular form, as taught by Findlay (see column 2, lines 53-58).

9. Claims 39 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379).

Regarding claim 39, although Rosenbaum et al. is silent as to the provision of a second fractionation column adapted to receive a top product from the first fractionation column 78, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a second fractionation column in the modified apparatus of Rosenbaum et al., on the basis of suitability for the intended use thereof, because the duplication of parts was held to have been obvious, *St. Regis Paper Co. v. Beemis Co. Inc.* 193 USPQ 8, 11 (1977); *In re Harza* 124 USPQ 378 (CCPA 1960), and the provision of a second fractionation column for enabling further separation of the fluid components would have been considered conventional in the art, as evidenced by the provision of the first and second fractionation columns **46** and **53** in the apparatus of Rosenbaum et al.

Regarding claim 41, as shown in the figure, none of the fractionation columns of Rosenbaum et al. comprise sidedraws.

10. Claims 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Findlay (US 3,035,040).

Rosenbaum et al. further discloses processing the equilibrium vapor in the fractionation system **78** to generate a liquid hydrocarbon that is recycled to the reactor **25** (i.e., via liquid delivery conduit **84**). Rosenbaum et al., however, is silent as to feeding the liquid hydrocarbon to a catalyst preparation tank. Findlay, however, teaches the feeding of a liquid hydrocarbon (in line **39**) to a catalyst preparation tank **16**. It would have been obvious for one of ordinary skill in the art at the time the invention was made to supply the liquid hydrocarbon from the liquid delivery conduit to a catalyst preparation tank in the modified apparatus of Rosenbaum et al., because it is preferable to suspend the catalyst in a diluent if the catalyst is in a particular form, as taught by Findlay (see column 2, lines 53-58).

11. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Hanson (US 5,597,892).

Rosenbaum et al. (Figure) discloses that the recycling comprises transporting the recovered hydrocarbon liquid to a recycle tank (i.e., a vessel **73**) and feeding the recovered hydrocarbon liquid from the recycle tank **73** to the polymerization reactor **25**. Rosenbaum et al., however, does not show a pump in line **74** for "pumping" the recovered hydrocarbon liquid from the recycle tank to the polymerization reactor **25**. Hanson, however, evidences the conventionality of providing a pump **44** for enabling the pumping of recovered hydrocarbon liquid from a recycle tank **42** back to a polymerization reactor **10**, via conduit **16** (see FIG. 1; column 3, lines 8-9). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a pump for pumping the recovered hydrocarbon liquid from

the recycle tank **73** to the reactor **25** in the process of Rosenbaum et al., because the provision of a pump for pumping the recovered hydrocarbon liquid from the recycle tank to the polymerization reactor would have been considered conventional in the art, as evidenced by Hanson, and furthermore, the pump would have enabled the feeding of recovered hydrocarbon liquid to the reactor to occur at a desired pressure and flow rate.

12. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Findlay (US 3,035,040).

Rosenbaum et al. further discloses processing the equilibrium vapor in the fractionation system **78** to generate a diluent substantially free of olefin that is recycled to the reactor **25** (i.e., via line **84**). Rosenbaum et al., however, is silent as to using the diluent in catalyst preparation and delivery. Findlay, however, teaches the use of recycled diluent in catalyst preparation and delivery (i.e., recycle solvent in line **39**, in combination with catalyst mud feeder **16**; Figure). It would have been obvious for one of ordinary skill in the art at the time the invention was made to use the diluent in catalyst preparation and delivery in the process of Rosenbaum et al., because it is preferable to suspend the catalyst in a diluent if the catalyst is in a particular form, as taught by Findlay (see column 2, lines 53-58).

13. Claims 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenbaum et al. (US 3,816,379) in view of Sherk et al. (US 4,501,885).

In Rosenbaum et al., the step of purging the polymer solids (i.e., in vessel **38**) uses a purge gas comprising steam (i.e., supplied via line **37**) to remove the residual hydrocarbon entrained in the polymer solids. The steam is separated from the hydrocarbon by condensing the steam in a cooler **41** and removing, via line **43**, the condensed steam as a water phase from the

vessel **42**. Rosenbaum et al. is silent as to the use of a different purge gas for removing the residual hydrocarbon entrained in the polymer solids, e.g., a non-condensable purge gas, such that the separation of the purge gas from the residual hydrocarbon involves the separation of a gas phase (and not a liquid, water phase) from the residual hydrocarbon.

Sherk et al. teaches a process for removing diluent from a polymer solid comprising the steps of purging a polymer solid (i.e., in a purge column **20**) with a purge gas (e.g., nitrogen; column 2, lines 29-31) to remove residual hydrocarbon entrained in the polymer solids, to form a first stream comprising the purge gas and the residual hydrocarbon (i.e., exiting the top of the purge column **20**, see figure); and separating the purge gas from the first stream to form a second stream comprising separated purge gas (i.e., in recycle line **50**), and a third stream comprising primarily hydrocarbon (e.g., an isobutene stream, see figure).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a different purge gas, e.g., a non-condensable purge gas, for the purge gas in the process of Rosenbaum et al., absent a showing of unexpected results thereof, because the substitution of one known equivalent technique (of removing diluent from a polymer solid) for another was held to be obvious, even if the prior art does not expressly suggest the substitution. *Ex parte Novak* 16 USPQ 2d 2041 (BPAI 1989); *In re Mostovych* 144 USPQ 38 (CCPA 1964); *In re Leshin* 125 USPQ 416 (CCPA 1960); *Graver Tank and Manufacturing Co. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

In addition, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further provide the step of transporting the second stream (comprising the separated purge gas) to the recycle tank or to the fractionation system, or a combination thereof,

in the modified process of Rosenbaum et al., because such step would allow for the additional recovery of any diluent remaining in the purge gas stream. As indicated in Sherk et al., such recovery would be desirable in order to minimize loss of diluent, and thereby minimize operating costs and hydrocarbon emissions (see column 1, lines 47-59).

Response to Arguments

14. Applicant's arguments as filed in the Appeal Brief on January 25, 2007 with respect to the rejection of claims 3 and 28 under 35 U.S.C. 112, second paragraph, have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

15. Applicant's arguments as filed in the Appeal Brief on January 25, 2007 with respect to the rejection(s) of claims 1-3, 5-17, 20-22, 24, 25, 27-36, 39-41 and 43-51 under 35 U.S.C. 103(a) have been fully considered and are persuasive. However, upon further consideration, a new ground(s) of rejection is made with respect to these claims, in view of the newly found prior art references.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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